

Considerations for smoking advice in pregnancy

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Accepted 3 March 1987.

SUMMARY

Cigarette smoking in pregnancy was the single most important preventable factor identified when determinants of birth weight were studied in 375 pregnancies. Current professional intervention was not effective in reducing cigarette consumption in pregnancy in these mothers in Londonderry, of whom only 19 (5%) became ex-smokers. Present health education, which emphasises impaired fetal growth and wellbeing, had its greatest effect amongst primigravid smokers of whom 32% made some reduction in cigarette consumption. Maternal expectation of birth weight differed significantly between non-smokers, light to moderate, and heavy smokers (8.2 lb, 7.9 lb, 7.3 lb respectively). 54% of multiparous smokers expected the birth weight to be similar to the birth weight in previous pregnancies. Of the women who reduced smoking, 57% did so for the baby, 23% because they found the habit less pleasurable during pregnancy and 13% because of professional advice. Maternal expectation of birth weight is one factor which negates the slant of current health education advice in pregnancy. An anti-smoking programme aimed at protecting the fetus from the harmful effects of cigarettes may produce optimal results when targeted at primary school-aged children in whom the smoking habit is less firmly established.

INTRODUCTION

Cigarette smoking in pregnancy was the single most important preventable factor identified when determinants of birth weight were considered in Irish newborns.¹ Most adults in Britain, irrespective of social class, are now non-smokers.² From 1972 to 1982 the proportion of men who were heavy smokers (20 or more cigarettes per day) decreased but no such change has been seen in women who smoke heavily, who are mostly in social class five.² The most effective way of persuading mothers to curtail smoking in pregnancy is not known. Methods used have largely concentrated on informing mothers of the hazards of smoking to the baby. It has been shown that those who gave up smoking during pregnancy in a study of London mothers were significantly better informed about fetal problems than those who continued to smoke.³

In Londonderry, an area with a high proportion of older, parous mothers, cigarette smoking in pregnancy is prevalent. Current professional advice does not appear effective in reducing the habit. This paper examines the expectations of birth weight in pregnant women in relation to cigarette consumption and considers maternal explanations for reduced smoking in pregnancy.

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METHODS AND PATIENTS

Three hundred and seventy-five mothers of consecutive, singleton, term deliveries at the Altnagelvin Hospital, Londonderry, were interviewed on the first or second postnatal day. The mothers were asked to complete a questionnaire under supervision which was designed to record maternal smoking habits and attitudes to smoking during pregnancy, the birth weight the mother had expected prior to the infant's birth and the reason for the estimated weight, and additional socio-cultural details regarding alcohol, education and employment. Maternal weight, height and other obstetric details were obtained from the medical records. Infant gestational age and anthropometric measurements were taken by methods previously described.¹ The mothers and infants were divided into three groups according to the average number of cigarettes smoked per day: non-smoker, mild to moderately heavy smoker (1–19), heavy smoker (20 or more). Where a range of cigarettes smoked was given, the upper figure was used. Statistical analyses were applied using chi squared and the one way analysis of variance.

RESULTS

Data from 375 mothers was analysed. Twenty-seven (7.2%) of the population were under 20 and 52 (13.8%) over 35 years. One hundred and forty-one (37.6%) were primigravid and 66 (17.6%) had had four or more pregnancies (grand multiparity). Other maternal characteristics are shown in Table I. When obstetric factors were considered, there was no statistical significance between the smoking groups for parity, previous large or small for gestational age infants or the incidence of pre-eclampsia. Respiratory illness occurred more frequently in the heavy smokers ($p = 0.004$). Although maternal height and weight at booking were similar in the three groups, the weight at delivery, the mid upper arm circumference at delivery and the weight gain per week were significantly different ($p = 0.0004$, $p = 0.0006$, $p = 0.003$ respectively) with the heavy smokers having lowest values. Adverse socio-cultural factors (young age, unmarried, unemployed, from a large family, no school examinations, alcohol consumption during pregnancy) were over-represented in the heavy smoking group and reached statistical significance. (On chi-squared tests, $p = 0.03$, 0.008 , 0.003 , 0.015 , 0.001 , 0.000 respectively). The heavy smoking group was least likely to want to breast-feed.

TABLE I

Maternal characteristics: 375 mothers. Mean \pm SD, or percentage of total group

Age (years)	27.2 \pm 6.1
Parity	1.7 \pm 2
Married	89.6%
Sibs	6.0 \pm 3.5
Gestation at booking (weeks)	19.9 \pm 8.3
Smoking prior to pregnancy	50.0%
Smoking during pregnancy	45.0%
Alcohol during pregnancy	32.0%
Husband unemployed	36.6%
Social class 4 or 5	30.0%

The anthropometric profile of the infants in relation to the pattern of smoking is shown in Table II. There was a significant effect of smoking in reducing birth weight, length and head circumference, and this was not accounted for by any possible difference in gestational age. The birth weight differential between non-smokers and smokers for gestational ages 37 to 41 weeks is shown in the Figure.

TABLE II
Anthropometric profile of infants (mean \pm SD)

	Non-smokers	Smokers		<i>p</i> value*
	<i>n</i> = 205	light to moderate <i>n</i> = 120	heavy <i>n</i> = 50	
Birth weight (kg)	3.5 \pm 0.5	3.3 \pm 0.4	3.2 \pm 0.4	0.0000
Length (cm)	51.7 \pm 2.2	50.6 \pm 2.2	50.2 \pm 2.2	0.0000
Head circumference (cm)	35.4 \pm 1.3	35.0 \pm 1.2	34.9 \pm 1.4	0.004
Arm circumference (cm)	10.6 \pm 0.9	10.2 \pm 0.8	10.2 \pm 0.8	0.03
Gestational age (wks)	39.4 \pm 1.2	39.4 \pm 1.1	39.4 \pm 1.2	0.92

*One-way analysis of variance.

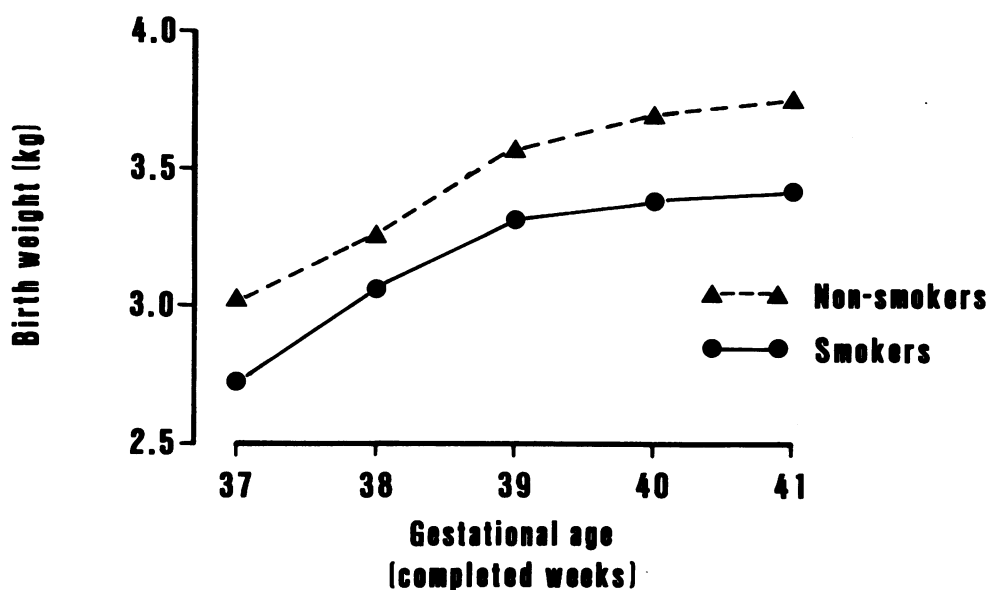


Figure. Graph of birth weight in relation to gestational age for non-smokers and smokers.

The average number of cigarettes smoked per day fell from 18 before pregnancy to 13.5 during pregnancy. Smoking profile in relation to parity is shown in Table III. Of the 109 mothers who reduced smoking, only 19 became non-smokers. A significantly larger number of primipara decreased smoking as compared with mothers with one to three children, or those with four or more, 32%, 29% and 24% respectively, ($p < 0.05$).

TABLE III

(i) *Smoking profile by parity and (ii) Explanation by parity for smoking decrease in 88 and 109 women who reduced cigarette consumption*

	0	Parity 1-3	≥ 4	Total
(i)				
<i>Smoking profile</i>	n = 141	n = 168	n = 66	n = 375
Non-smoker	73 (52%)	86 (51%)	29 (44%)	188 (50%)
Smoking unchanged	15 (11%)	25 (15%)	17 (26%)	57 (15%)
Increased smoking	8 (5%)	9 (5%)	4 (6%)	21 (6%)
Decreased smoking	45 (32%)	48 (29%)	16 (24%)	109 (29%)
(ii)				
<i>Reason smoking decreased</i>	n = 35	n = 40	n = 13	88 (81%)
'For baby'	20 (57%)	22 (55%)	8 (62%)	50 (57%)
'Didn't feel like it'	9 (26%)	8 (20%)	3 (23%)	20 (23%)
'Professional said'	4 (11%)	7 (17%)	1 (7.5%)	12 (13%)
Other reason	2 (6%)	3 (7%)	1 (7.5%)	6 (7%)

Maternal expectation of birth weight was analysed in relation to smoking pattern. The non-smokers expected significantly higher birth weights than either of the smoking groups: estimated mean birth weights 8.2 lb \pm 1.2, 7.9 lb \pm 1.4, 7.3 lb \pm 1.5 ($p = 0.0001$) for non-smokers, light/moderate and heavy smokers respectively. The reasons most frequently given for the estimated birth weight by primigravid patients were 'The doctor said so' or 'It is an average or normal birth weight' (72%). The reason most frequently given by multiparous patients was 'Same as last time' (54%). The frequency of the reason 'Same as last time' varied with the smoking pattern — in multiparous non-smokers 57%, in those who either increased smoking or smoked the same 54% and 50% respectively, and in those who decreased smoking 37%. Only one woman said she expected her infant to be small because of smoking during pregnancy.

Responses to the questions 'Why did you cut down your cigarettes?' were received from 88 (81%) of the 109 who did reduce smoking and are shown in the second part of Table III; the majority reduced their habit 'for the baby'.

DISCUSSION

The questionnaire format, which was used post-natally to document the number of cigarettes smoked both before pregnancy and after the mother knew she was pregnant, has limitations posed by the truthfulness and recall of the patient. Variations in cigarette consumption, which are known to exist during pregnancy, have not been assessed. Effects of cigarette smoking on pregnancy have been reported in the first trimester, with an increase in spontaneous abortions amongst smoking mothers.⁴ Late fetal and neonatal mortality rates are similarly increased⁵ and studies on birth weight patterns from various populations have consistently demonstrated that the distribution shifts downwards in proportion to the number

of cigarettes smoked.⁶ This study confirms this effect in babies carried to term. The socio-economic background of heavy smokers in this population differed significantly from the non-smokers. It has been shown that the effects of cigarette smoking on fetal weight are evident after allowance has been made for age, parity and social class differences which exist between smokers and non-smokers.⁷

In the present study 10% of the smokers completely curtailed the habit during pregnancy. There was no reduction in the mean birth weight when non-smoking and ex-smoking mothers were compared (3551g and 3555g respectively). Martin has noted that 13% of mothers stopped smoking in pregnancy⁸ and Butler and Alberman reported that the average birth weight and perinatal mortality rate in mothers who gave up smoking by the fourth month of pregnancy was the same as in non-smokers.⁷ The most effective way of persuading mothers to curtail smoking in pregnancy is not known. Sixty-four per cent of smokers reduced cigarette consumption during pregnancy, and, when asked why, most commonly said it was for the sake of the baby. Almost a quarter reduced smoking, however, because the habit was less enjoyable in pregnancy and the heavy smokers gave this as the reason as often as any other. Dalton et al³ in a study of low social class mothers in London noted that health education posters and leaflets did little to increase the percentage of women admitting knowledge of the dangers of smoking or the proportion who stopped smoking. Those who gave up smoking during pregnancy were significantly better informed about fetal hazard than those who continued to smoke. Donovan, in a randomised controlled trial of anti-smoking advice in pregnancy, saw a reduction in cigarettes smoked in the test group, but no significant increase in birth weight, despite intensive individual smoking advice at each antenatal visit.⁹ The reasons for the failure to influence birth weight were not clear but it may have been that those counselled did not reduce their smoking sufficiently.

The multiparous women in the present study were less likely to alter their smoking pattern in pregnancy than the primigravida. The majority of parous mothers (54%) anticipated that the birth weight of the infant would be similar to that in previous pregnancies. Part of the present health education message which highlights compromised growth as a result of maternal cigarette smoking, in itself, is unlikely to motivate such a mother to curtail her smoking. Graham has found that one of the critical variables in the continuation of smoking in pregnancy is not ignorance of 'the facts', but rather the credibility the individual accorded to these facts in particular and to scientific knowledge in general.¹⁰

Maternal attitudes to cigarette smoking in pregnancy are complex. The way smoking mothers perceive their smoking habit during pregnancy remains relatively uninvestigated but must have important implications for the timing and the content of health education. Co-ordinated, concentrated smoking advice from general practitioner, health visitor, midwife and obstetrician from early pregnancy has had limited success.⁹ Any programme of intervention aimed at altering a mother's smoking habit once she is pregnant seems doomed to failure, because attitudes and expectations which work to negate professional advice appear to be well established long before this. A health education programme is needed which will influence the potential mother before she ever starts to smoke. The timing of this needs to be brought forward to precede the teenage years and to become an increasing part of primary education. Social class trends in birth weight are due, for the greater part, to heavier smoking during pregnancy of women in the lower social classes. If we seek to ameliorate some of the influences

of home on smoking behaviour, we will need to establish non-smoking behaviour as the norm in society. To this end I would envisage a primary school-based health education programme. Before this or any new method was operational, the psychological aspects of the approach towards the potential mothers and fathers of tomorrow would need to be evaluated.

I should like to thank the mothers, the midwives and the consultants in the obstetric and paediatric departments of Altnagelvin Hospital for their help and encouragement during this study and the Department of Computing and Medical Statistics, Queen's University, Belfast, for assistance with statistical analysis.

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